

What is claimed is:

1. An interbody spinal implant for insertion between adjacent vertebral bodies of a human spine, said implant comprising:

a leading end for introduction of said spinal implant into the spine, an opposite trailing end, and spaced apart sides therebetween;

opposite upper and lower surfaces between said leading and trailing ends and said spaced apart sides, said upper surface adapted for placement in engagement with the bone of one of the vertebral bodies and said opposite lower surface adapted for placement in engagement with the bone of the other of the vertebral bodies when said implant is placed between the adjacent vertebral bodies; and

a plurality of bone engaging structures formed on said upper and lower surfaces, at least one of said bone engaging structures comprising surface projections having at least one forward facing facet directed at least in part toward said leading end and at least one rearward facet directed at least in part toward said trailing end, each of said forward facet and rearward facet having a length and a slope, the length of said forward facet being longer than said rearward facet, the slope of said rearward facet being steeper than the slope of said forward facet, said surface projections having opposed side facets directed generally toward said sides of said implant, said side facets located between said forward facet and said rearward facet of said surface projections, said side facets converging toward each other in a direction away from the base of said projections.

2. The spinal implant of claim 1, wherein said rearward facet is perpendicular to at least one of said upper and lower surfaces of said implant.

3. The spinal implant of claim 1, wherein said rearward facet is at an angle to at least one of said upper and lower surfaces of said implant.
4. The spinal implant of claim 3, wherein said angle is less than 90 degrees.
5. The spinal implant of claim 3, wherein said angle is greater than 90 degrees.
6. The spinal implant of claim 1, wherein said opposed side facets intersect each other.
7. The spinal implant of claim 6, wherein said opposed side facets converge to form a peak at the top of each of said surface projections.
8. The spinal implant of claim 7, wherein said peaks are aligned along lines that are at least one of perpendicular, parallel, and diagonal to the longitudinal axis of said implant.
9. The spinal implant of claim 1, wherein each of said surface projections includes a left forward side facet and a right forward side facet directed toward said leading end and said sides, respectively, of said implant.
10. The spinal implant of claim 1, wherein each of said surface projections includes a left rearward side facet and a right rearward side facet directed toward said trailing end and sides, respectively, of said implant.
11. The spinal implant of claim 9, wherein each of said surface projections includes a left rearward side facet and a right rearward side facet directed toward said trailing end and sides, respectively, of said implant.
12. The spinal implant of claim 1, wherein adjacent side facets of adjacent surface projections are spaced apart to define a groove therebetween.

13. The spinal implant of claim 12, wherein a plurality of adjacent surface projections are spaced apart to form a plurality of grooves therebetween.

14. The spinal implant of claim 13, wherein at least one of said grooves is parallel to the longitudinal axis of said implant.

15. The spinal implant of claim 13, wherein at least one of said grooves is at an angle to the longitudinal axis of said implant.

16. The spinal implant of claim 15, wherein said angle is less than 90 degrees to the longitudinal axis of said implant.

17. The spinal implant of claim 13, wherein at least two of said grooves cross each other.

18. The spinal implant of claim 13, wherein at least one of said grooves has a horizontal cross-sectional shape selected from one of a v-shape, u-shape, and a box-like shape.

19. The spinal implant of claim 1, wherein said projections are oriented relative to one another to form an array.

20. The spinal implant of claim 1, wherein said projections are geometrically disposed relative to one another.

21. The spinal implant of claim 1, wherein said upper and lower surfaces of said implant are at least in part arcuate.

22. The spinal implant of claim 1, wherein at least one of said leading end, trailing end, and sides are curved.

23. The spinal implant of claim 1, wherein said sides are curved.

24. The spinal implant of claim 1, wherein each of said leading end, trailing end, and sides are curved.
25. The spinal implant of claim 24, wherein said leading end, trailing end, and sides form a circle.
26. The spinal implant of claim 1, wherein said upper and lower surfaces of said implant are at least in part planar.
27. The spinal implant of claim 1, wherein said upper and lower surfaces converge along the length of said implant.
28. The spinal implant of claim 1, wherein said implant comprises a material other than bone.
29. The spinal implant of claim 1, wherein said implant comprises bone.
30. The spinal implant of claim 29, wherein said bone includes cortical bone.
31. The spinal implant of claim 1, wherein said implant comprises bone growth promoting material.
32. The spinal implant of claim 31, wherein said bone growth promoting material is selected from one of bone morphogenetic protein, hydroxyapatite, and genes coding for the production of bone.
33. The spinal implant of claim 1, wherein said implant is treated with a bone growth promoting substance.
34. The spinal implant of claim 1, wherein said implant is a source of osteogenesis.
35. The spinal implant of claim 1, wherein said implant is at least in part bioabsorbable.
36. The spinal implant of claim 1, wherein said implant comprises metal.

37. The spinal implant of claim 36, wherein said metal is ASTM material suitable for use as a spinal fusion implant.
38. The implant of claim 36, wherein said metal includes titanium.
39. The implant of claim 1, wherein said implant comprises a plastic material.
40. The implant of claim 1, wherein said implant comprises a ceramic material.
41. The implant of claim 1, wherein said implant is formed of a porous material.
42. The implant of claim 1, wherein said implant is formed of a material that intrinsically participates in the growth of bone from one of the adjacent vertebral bodies to the other of the adjacent vertebral bodies.
43. The spinal implant of claim 1, wherein said implant is a motion preserving device adapted to space apart and allow motion between the adjacent vertebral bodies.
44. The spinal implant of claim 1, wherein said spinal implant is a fusion implant.
45. The spinal implant of claim 44, wherein said upper and lower surfaces include at least one opening to permit bone growth from one of the adjacent vertebral bodies to the other one of the adjacent vertebral bodies through said implant.
46. The spinal implant of claim 44, wherein said implant has an internal chamber and an access opening for accessing said internal chamber.
47. The spinal implant of claim 46, wherein said implant has a cap for closing said access opening.
48. The spinal implant of claim 46, wherein said upper and lower surfaces include at least one opening in communication with said internal chamber to permit bone growth from one of the adjacent vertebral bodies to the other one of the adjacent vertebral bodies through said implant.

49. The spinal implant of claim 46, wherein said internal chamber is capable of containing bone growth promoting material.
50. The spinal implant of claim 49, wherein said bone growth promoting material is selected from one of bone morphogenetic protein, hydroxyapatite, and genes coding for the production of bone.
51. The spinal implant of claim 1, further comprising at least one opening capable of retaining fusion promoting materials.
52. The spinal implant of claim 1, further comprising at least one cut cleaving said surface projection into at least two portions.
53. The spinal implant of claim 52, further comprising at least a second cut cleaving said surface projection into at least four portions.
54. The spinal implant of claim 52, where said cut penetrates said surface projection at a depth substantially equal to that of the height of said surface projection.
55. The spinal implant of claim 53, where said second cut penetrates said surface projection at a depth substantially equal to that of the height of said surface projection.
56. The spinal implant of claim 52, wherein said cut is oriented along one of the longitudinal axis of said implant, an axis perpendicular to the longitudinal axis of said implant, and an axis at an angle between the longitudinal axis and the axis perpendicular to the longitudinal axis of said implant.
57. An interbody spinal implant for insertion between adjacent vertebral bodies of a human spine, said implant comprising:

a leading end for introduction of said spinal implant into the spine, an opposite trailing end, spaced apart sides therebetween, and a longitudinal axis passing through said leading and trailing ends;

opposite upper and lower surfaces between said leading and trailing ends and said spaced apart sides, said upper surface adapted for placement in engagement with the bone of one of the vertebral bodies and said opposite lower surface adapted for placement toward the bone of the other of the vertebral bodies when said implant is placed between the adjacent vertebral bodies; and

a first plurality of bone engaging structures formed on said upper and lower surfaces, said first plurality of bone engaging structures comprising surface projections having at least one forward facing facet directed at least in part toward said leading end and at least one rearward portion directed at least in part toward said trailing end, said forward facet and said rearward portion having a length and a slope, the length of said forward facet being longer than the length of said rearward portion, the slope of said rearward portion being steeper than the slope of said forward facet, said projections having opposed side facets between said forward facet and said rearward portion, said side facets having at least a first portion in a plane at an angle to the longitudinal axis of said implant.

58. The spinal implant of claim 57, wherein said rearward portion is perpendicular to at least one of said upper and lower surfaces of said implant.

59. The spinal implant of claim 57, wherein said rearward portion is at an angle to at least one of said upper and lower surfaces of said implant.

60. The spinal implant of claim 59, wherein said angle is less than 90 degrees.

61. The spinal implant of claim 59, wherein said angle is greater than 90 degrees.
62. The spinal implant of claim 57, wherein said opposed side facets intersect each other.
63. The spinal implant of claim 62, wherein said opposed side facets converge to form a peak at the top of each of said surface projections.
64. The spinal implant of claim 63, wherein said peaks are aligned along lines that are at least one of perpendicular, parallel, and diagonal to the longitudinal axis of said implant.
65. The spinal implant of claim 57, wherein said side facets have a second portion at an angle, wherein the angles of said first portion and said second portion are different.
66. The spinal implant of claim 57, wherein each of said surface projections includes a left forward side facet and a right forward side facet directed toward said leading end and said sides, respectively, of said implant.
67. The spinal implant of claim 57, wherein each of said surface projections includes a left rearward side facet and a right rearward side facet directed toward said trailing end and sides, respectively, of said implant.
68. The spinal implant of claim 66, wherein each of said surface projections includes a left rearward side facet and a right rearward side facet directed toward said trailing end and sides, respectively, of said implant.
69. The spinal implant of claim 57, wherein adjacent side facets of adjacent surface projections are spaced apart to define a groove therebetween.
70. The spinal implant of claim 69, wherein a plurality of adjacent surface projections are spaced apart to form a plurality of grooves therebetween.



71. The spinal implant of claim 70, wherein at least one of said grooves is parallel to the longitudinal axis of said implant.

72. The spinal implant of claim 70, wherein at least one of said grooves is at an angle to the longitudinal axis of said implant.

73. The spinal implant of claim 72, wherein said angle is less than 90 degrees to the longitudinal axis of said implant.

74. The spinal implant of claim 72, wherein at least two of said grooves cross each other.

75. The spinal implant of claim 70, wherein at least one of said grooves has a horizontal cross-sectional shape selected from one of a v-shape, u-shape, and a box-like shape.

76. The spinal implant of claim 57, wherein said projections are oriented relative to one another to form an array.

77. The spinal implant of claim 57, wherein said projections are geometrically disposed relative to one another.

78. The spinal implant of claim 57, wherein said upper and lower surfaces of said implant are at least in part arcuate.

79. The spinal implant of claim 57, wherein at least one of said leading end, trailing end, and sides are curved.

80. The spinal implant of claim 57, wherein said sides are curved.

81. The spinal implant of claim 57, wherein each of said leading end, trailing end, and sides are curved.

82. The spinal implant of claim 81, wherein said leading end, trailing end, and sides form a circle.

83. The spinal implant of claim 57, wherein said upper and lower surfaces of said implant are at least in part planar.

84. The spinal implant of claim 57, wherein said upper and lower surfaces converge along the length of said implant.

85. The spinal implant of claim 57, wherein said implant comprises a material other than bone.

86. The spinal implant of claim 57, wherein said implant comprises bone.

87. The spinal implant of claim 86, wherein said bone includes cortical bone.

88. The spinal implant of claim 57, wherein said implant comprises bone growth promoting material.

89. The spinal implant of claim 88, wherein said bone growth promoting material is selected from one of bone morphogenetic protein, hydroxyapatite, and genes coding for the production of bone.

90. The spinal implant of claim 57, wherein said implant is treated with a bone growth promoting substance.

91. The spinal implant of claim 57, wherein said implant is a source of osteogenesis.

92. The spinal implant of claim 57, wherein said implant is at least in part bioabsorbable.

93. The spinal implant of claim 57, wherein said implant comprises metal.

94. The spinal implant of claim 93, wherein said metal is ASTM material suitable for use as a spinal fusion implant.

95. The implant of claim 93, wherein said metal includes titanium.
96. The implant of claim 57, wherein said implant comprises a plastic material.
97. The implant of claim 57, wherein said implant comprises a ceramic material.
98. The implant of claim 57, wherein said implant is formed of a porous material.
99. The implant of claim 57, wherein said implant is formed of a material that intrinsically participates in the growth of bone from one of the adjacent vertebral bodies to the other of the adjacent vertebral bodies.
100. The spinal implant of claim 57, wherein said implant is a motion preserving device adapted to space apart and allow motion between the adjacent vertebral bodies.
101. The spinal implant of claim 57, wherein said spinal implant is a fusion implant.
102. The spinal implant of claim 101, wherein said upper and lower surfaces include at least one opening to permit bone growth from one of the adjacent vertebral bodies to the other one of the adjacent vertebral bodies through said implant.
103. The spinal implant of claim 101, wherein said implant has an internal chamber and an access opening for accessing said internal chamber.
104. The spinal implant of claim 103, wherein said implant has a cap for closing said access opening.
105. The spinal implant of claim 103, wherein said upper and lower surfaces include at least one opening in communication with said internal chamber to permit bone growth from one of the adjacent vertebral bodies to the other one of the adjacent vertebral bodies through said implant.
106. The spinal implant of claim 103, wherein said internal chamber is capable of containing bone growth promoting material.

107. The spinal implant of claim 106, wherein said bone growth promoting material is selected from one of bone morphogenetic protein, hydroxyapatite, and genes coding for the production of bone.

108. The spinal implant of claim 57, further comprising at least one opening capable of retaining fusion promoting materials.

109. The spinal implant of claim 57, further comprising at least one cut cleaving said surface projection into at least two portions.

110. The spinal implant of claim 109, further comprising at least a second cut cleaving said surface projection into at least four portions.

111. The spinal implant of claim 109, where said cut penetrates said surface projection at a depth substantially equal to that of the height of said surface projection.

112. The spinal implant of claim 110, where said second cut penetrates said surface projection at a depth substantially equal to that of the height of said surface projection.

113. The spinal implant of claim 109, wherein said cut is oriented along one of the longitudinal axis of said implant, an axis perpendicular to the longitudinal axis of said implant, and an axis at an angle between the longitudinal axis and the axis perpendicular to the longitudinal axis of said implant.

114. The spinal implant of claim 57 further comprising a second plurality of bone engaging structures formed on said upper and lower surfaces, said second plurality of bone engaging structures comprising surface projections having at least a left forward side facet and a right forward side facet directed at least in part toward said leading end and said sides, respectively, and at least one rearward facet directed at least in part

toward said trailing end, said left and right forward side facets having at least a first portion in a plane at an angle to the longitudinal axis of said implant.

115. The spinal implant of claim 114, wherein said second plurality of bone engaging structures are interspersed with said first plurality of bone engaging structures.

116. The spinal implant of claim 114 further comprising a third plurality of bone engaging structures formed on said upper and lower surfaces, said third plurality of bone engaging structures comprising surface projections having at least a left rearward side facet and a right rearward side facet directed at least in part toward said trailing end and said sides, respectively, and at least one forward facet directed at least in part toward said leading end, said left and right rearward side facets having at least a first portion in a plane at an angle to the longitudinal axis of said implant.

117. The spinal implant of claim 116, wherein said third plurality of bone engaging structures are interspersed with said first plurality of bone engaging structures.

118. The spinal implant of claim 116, wherein said second and third plurality of bone engaging structures are interspersed with said first plurality of bone engaging structures.

119. The spinal implant of claim 116, wherein said surface projection of said first bone engaging structures have a length approximating the combined length of said surface projections of said second and third bone engaging structures.

120. The spinal implant of claim 57 further comprising a third plurality of bone engaging structures formed on said upper and lower surfaces, said third plurality of bone engaging structures comprising surface projections having at least a left rearward side facet and a right rearward side facet directed at least in part toward said trailing

58  
C17

end and said sides, respectively, and at least one forward facet directed at least in part toward said leading end, said left and right rearward side facets having at least a first portion in a plane at an angle to the longitudinal axis of said implant.

121. A method for forming an interbody spinal implant having a plurality of bone engaging structures for insertion between adjacent vertebral bodies of a human spine, the method comprising the steps of:

providing the implant comprising a leading end for introduction of the spinal implant into the spine, an opposite trailing end, and spaced apart sides therebetween, opposite upper and lower surfaces between said leading and trailing ends and said spaced apart sides, said upper surface adapted for placement toward the bone of one of the vertebral bodies and said opposite lower surface adapted for placement toward the bone of the other of the vertebral bodies when said implant is placed between the adjacent vertebral bodies; and

forming a plurality of surface projections as part of the upper and lower surfaces of the implant, the surface projections being formed to have at least one forward facet directed at least in part toward the leading end and at least one rearward facet directed at least in part toward the trailing end, said forward facet and rearward facet being formed to have a length and a slope, the length of said forward facet being longer than said rearward facet, the slope of said rearward facet being steeper than the slope of said forward facet, said surface projections being formed to have opposed side facets directed generally toward said sides of the implant, said side facets located between said forward facet and said rearward facet of said surface projections, said side facets converging toward each other in a direction away from the base of said projections.

122. The method of claim 121, wherein the step of forming includes one of the sub-steps of grinding, milling, burning, lasering, burnishing, electric discharge machining, and broaching to form said surface projections.

123. The method of claim 121, wherein the steps of providing and forming include the sub-step of casting to form said implant with said surface projections.

124. The method of claim 121, wherein said forming step includes the sub-step of orienting said projections relative to one another to form an array.

125. The method of claim 121, wherein said forming step includes the sub-step of orienting said projections to be geometrically disposed relative to one another.

126. A method for forming an interbody spinal implant having an exterior surface with a plurality of bone engaging structures for insertion between adjacent vertebral bodies of a human spine, the method comprising the steps of:

providing the implant comprising a leading end for introduction of the spinal implant into the spine, an opposite trailing end, spaced apart sides therebetween, and a longitudinal axis passing through the leading and trailing ends, opposite upper and lower surfaces between said leading and trailing ends and said spaced apart sides, said upper surface adapted for placement toward the bone of one of the vertebral bodies and said opposite lower surface adapted for placement toward the bone of the other of the vertebral bodies when the implant is placed between the adjacent vertebral bodies; and

forming surface projections as part of the upper and lower surfaces of the implant, said surface projections having at least one forward facet directed at least in part toward the leading end and at least one rearward facet directed at least in part toward the trailing end, said forward facet and said rearward facet having a length and a

slope, the length of said forward facet being longer than the length of said rearward facet, the slope of said rearward facet being steeper than the slope of said forward facet, said projections having opposed side facets between said forward facet and said rearward facet, said side facets having at least a first portion in a plane at an angle to the longitudinal axis of the implant.

127. The method of claim 126, wherein the step of forming includes one of the sub-steps of grinding, milling, burning, lasering, burnishing, electric discharge machining, broaching, and machining to form said surface projections.

128. The method of claim 126, wherein the steps of providing and forming include the sub-step of casting to form said implant with said surface projections.

129. The method of claim 126, wherein said forming step includes the sub-step of orienting said projections relative to one another to form an array.

130. The method of claim 126, wherein said forming step includes the sub-step of orienting said projections to be geometrically disposed relative to one another.

131. An interbody spinal implant for insertion between adjacent vertebral bodies of a human spine, said implant comprising:

a leading end, an opposite trailing end, and spaced apart opposite sides therebetween;

opposite upper and lower surfaces between said leading and trailing ends and said spaced apart sides, said upper surface adapted for placement in engagement with the bone of one of the vertebral bodies and said opposite lower surface adapted for placement in engagement with the bone of the other of the vertebral bodies when said implant is placed between the adjacent vertebral bodies; and



09921351-000301  
a plurality of bone engaging structures formed on said upper and lower surfaces, at least one of said bone engaging structures comprising surface projections having at least one forward facing facet directed at least in part toward one of said spaced apart opposite sides and at least one rearward facet directed at least in part toward the other one of said spaced apart opposite sides, each of said forward facet and rearward facet having a length and a slope, the length of said forward facet being longer than said rearward facet, the slope of said rearward facet being steeper than the slope of said forward facet, said surface projections having opposed side facets directed generally toward said leading and trailing ends, respectively, said side facets located between said forward facet and said rearward facet of said surface projections, said side facets converging toward each other in a direction away from the base of said projections.

132. The spinal implant of claim 131, wherein said rearward facet is perpendicular to at least one of said upper and lower surfaces of said implant.

133. The spinal implant of claim 131, wherein said rearward facet is at an angle to at least one of said upper and lower surfaces of said implant.

134. The spinal implant of claim 133, wherein said angle is less than 90 degrees.

135. The spinal implant of claim 133, wherein said angle is greater than 90 degrees.

136. The spinal implant of claim 131, wherein adjacent side facets of adjacent surface projections are spaced apart to define a groove therebetween.

137. The spinal implant of claim 124, wherein said projections are oriented relative to one another to form an array.

138. The spinal implant of claim 131, wherein said projections are geometrically disposed relative to one another.

139. The spinal implant of claim 131, wherein said upper and lower surfaces of said implant are at least in part arcuate.

140. The spinal implant of claim 131, wherein said upper and lower surfaces of said implant are at least in part planar.

141. The spinal implant of claim 131, wherein said upper and lower surfaces converge along the length of said implant.

142. The spinal implant of claim 131, wherein said implant comprises bone growth promoting material.

143. The spinal implant of claim 142, wherein said bone growth promoting material is selected from one of bone morphogenetic protein, hydroxyapatite, and genes coding for the production of bone.

144. The spinal implant of claim 131, wherein said implant is a motion preserving device adapted to space apart and allow motion between the adjacent vertebral bodies.

145. The spinal implant of claim 131, wherein said spinal implant is a fusion implant.

146. An interbody spinal implant for insertion between adjacent vertebral bodies of a human spine, said implant comprising:

a leading end for introduction of said spinal implant into the spine, an opposite trailing end, spaced apart sides therebetween, and a longitudinal axis passing through said leading and trailing ends;

opposite upper and lower surfaces between said leading and trailing ends and said spaced apart sides, said upper surface adapted for placement in engagement with the bone of one of the vertebral bodies and said opposite lower surface adapted for

placement toward the bone of the other of the vertebral bodies when said implant is placed between the adjacent vertebral bodies; and

a plurality of bone engaging structures formed on said upper and lower surfaces, said plurality of bone engaging structures comprising surface projections having at least a left forward side facet and a right forward side facet directed at least in part toward said leading end and said sides, respectively, and a single rearward facet directed at least in part toward said trailing end, said left and right forward side facets having at least a first portion in a plane at an angle to the longitudinal axis of said implant.

147. The spinal implant of claim 146 further comprising another plurality of bone engaging structures formed on said upper and lower surfaces, said another plurality of bone engaging structures comprising surface projections having at least one forward facing facet directed at least in part toward said leading end and at least one rearward portion directed at least in part toward said trailing end, said forward facing facet and said rearward portion having a length and a slope, the length of said forward facing facet being longer than the length of said rearward portion, the slope of said rearward portion being steeper than the slope of said forward facing facet, said projections having opposed side facets between said forward facing facet and said rearward portion, said side facets having at least a first portion in a plane at an angle to the longitudinal axis of said implant.

148. The spinal implant of claim 147, wherein said another plurality of bone engaging structures are interspersed with said plurality of bone engaging structures.

149. The spinal implant of claim 147 further comprising a third plurality of bone engaging structures formed on said upper and lower surfaces, said third plurality of

bone engaging structures comprising surface projections having at least a left rearward side facet and a right rearward side facet directed at least in part toward said trailing end and said sides, respectively, and at least one forward facet directed at least in part toward said leading end, said left and right rearward side facets having at least a first portion in a plane at an angle to the longitudinal axis of said implant.

150. The spinal implant of claim 149, wherein said third plurality of bone engaging structures are interspersed with said plurality of bone engaging structures.

151. The spinal implant of claim 149, wherein said another and third plurality of bone engaging structures are interspersed with said plurality of bone engaging structures.

152. The spinal implant of claim 149, wherein said surface projection of said another bone engaging structures have a length approximating the combined length of said surface projections of said bone engaging structures and third bone engaging structures.

153. The spinal implant of claim 146 further comprising a third plurality of bone engaging structures formed on said upper and lower surfaces, said third plurality of bone engaging structures comprising surface projections having at least a left rearward side facet and a right rearward side facet directed at least in part toward said trailing end and said sides, respectively, and at least one forward facet directed at least in part toward said leading end, said left and right rearward side facets having at least a first portion in a plane at an angle to the longitudinal axis of said implant.

154. The spinal implant of claim 146 further comprising another plurality of bone engaging structures formed on said upper and lower surfaces, at least one of said another bone engaging structures comprising surface projections having at least one

forward facing facet directed at least in part toward said leading end and at least one rearward facet directed at least in part toward said trailing end, each of said forward facet and rearward facet having a length and a slope, the length of said forward facet being longer than said rearward facet, the slope of said rearward facet being steeper than the slope of said forward facet, said surface projections having opposed side facets directed generally toward said sides of said implant, said side facets located between said forward facet and said rearward facet of said surface projections, said side facets converging toward each other in a direction away from the base of said projections.

155. The spinal implant of claim 146, wherein said rearward facet is perpendicular to at least one of said upper and lower surfaces of said implant.

156. The spinal implant of claim 146, wherein said rearward facet is at an angle to at least one of said upper and lower surfaces of said implant.

157. The spinal implant of claim 156, wherein said angle is less than 90 degrees.

158. The spinal implant of claim 156, wherein said angle is greater than 90 degrees.

159. The spinal implant of claim 146, wherein said left and right forward side facets intersect each other.

160. The spinal implant of claim 146, wherein adjacent left and right forward side facets of adjacent surface projections are spaced apart to define a groove therebetween.

161. The spinal implant of claim 146, wherein said projections are oriented relative to one another to form an array.

162. The spinal implant of claim 146, wherein said projections are geometrically disposed relative to one another.
163. The spinal implant of claim 146, wherein said upper and lower surfaces of said implant are at least in part planar.
164. The spinal implant of claim 146, wherein said upper and lower surfaces converge along the length of said implant.
165. The spinal implant of claim 146, wherein said implant comprises a material other than bone.
166. The spinal implant of claim 146, wherein said implant comprises bone.
167. The spinal implant of claim 166, wherein said bone includes cortical bone.
168. The spinal implant of claim 146, wherein said implant comprises bone growth promoting material.
169. The spinal implant of claim 168, wherein said bone growth promoting material is selected from one of bone morphogenetic protein, hydroxyapatite, and genes coding for the production of bone.
170. The spinal implant of claim 146, wherein said implant is at least in part bioabsorbable.
171. The spinal implant of claim 146, wherein said implant is a motion preserving device adapted to space apart and allow motion between the adjacent vertebral bodies.
172. The spinal implant of claim 146, wherein said upper and lower surfaces include at least one opening to permit bone growth from one of the adjacent vertebral bodies to the other one of the adjacent vertebral bodies through said implant.

173. The spinal implant of claim 146, further comprising at least one cut cleaving said surface projection into at least two portions.

174. The spinal implant of claim 173, where said cut penetrates said surface projection at a depth substantially equal to that of the height of said surface projection.

175. An interbody spinal implant for insertion between adjacent vertebral bodies of a human spine, said implant comprising:

a leading end for introduction of said spinal implant into the spine, an opposite trailing end, spaced apart sides therebetween, and a longitudinal axis passing through said leading and trailing ends;

opposite upper and lower surfaces between said leading and trailing ends and said spaced apart sides, said upper surface adapted for placement in engagement with the bone of one of the vertebral bodies and said opposite lower surface adapted for placement toward the bone of the other of the vertebral bodies when said implant is placed between the adjacent vertebral bodies; and

a plurality of bone engaging structures formed on said upper and lower surfaces, said third plurality of bone engaging structures comprising surface projections having at least a left rearward side facet and a right rearward side facet directed at least in part toward said trailing end and said sides, respectively, and a single forward facet directed at least in part toward said leading end, said left and right rearward side facets having at least a first portion in a plane at an angle to the longitudinal axis of said implant.

176. The spinal implant of claim 175 further comprising another plurality of bone engaging structures formed on said upper and lower surfaces, said another plurality of bone engaging structures comprising surface projections having at least one forward

facing facet directed at least in part toward said leading end and at least one rearward portion directed at least in part toward said trailing end, said forward facet and said rearward portion having a length and a slope, the length of said forward facet being longer than the length of said rearward portion, the slope of said rearward portion being steeper than the slope of said forward facet, said projections having opposed side facets between said forward facet and said rearward portion, said side facets having at least a first portion in a plane at an angle to the longitudinal axis of said implant.

177. The spinal implant of claim 176, wherein said another plurality of bone engaging structures are interspersed with said plurality of bone engaging structures.

178. The spinal implant of claim 176 further comprising a second plurality of bone engaging structures formed on said upper and lower surfaces, said plurality of bone engaging structures comprising surface projections having at least a left forward side facet and a right forward side facet directed at least in part toward said leading end and said sides, respectively, and a single rearward facet directed at least in part toward said trailing end, said left and right forward side facets having at least a first portion in a plane at an angle to the longitudinal axis of said implant.

179. The spinal implant of claim 178, wherein said second plurality of bone engaging structures are interspersed with said plurality of bone engaging structures.

180. The spinal implant of claim 178, wherein said another and second plurality of bone engaging structures are interspersed with said plurality of bone engaging structures.

181. The spinal implant of claim 178, wherein said surface projections of said another bone engaging structures have a length approximating the combined length of said



surface projections of said bone engaging structures and second bone engaging structures.

182. The spinal implant of claim 175 further comprising a second plurality of bone engaging structures formed on said upper and lower surfaces, said second plurality of bone engaging structures comprising surface projections having at least a left forward side facet and a right forward side facet directed at least in part toward said leading end and said sides, respectively, and a single rearward facet directed at least in part toward said trailing end, said left and right forward side facets having at least a first portion in a plane at an angle to the longitudinal axis of said implant.

183. The spinal implant of claim 175 further comprising another plurality of bone engaging structures formed on said upper and lower surfaces, at least one of said another bone engaging structures comprising surface projections having at least one forward facing facet directed at least in part toward said leading end and at least one rearward facet directed at least in part toward said trailing end, each of said forward facet and rearward facet having a length and a slope, the length of said forward facet being longer than said rearward facet, the slope of said rearward facet being steeper than the slope of said forward facet, said surface projections having opposed side facets directed generally toward said sides of said implant, said side facets located between said forward facet and said rearward facet of said surface projections, said side facets converging toward each other in a direction away from the base of said projections.

184. The spinal implant of claim 175, wherein said forward facet is perpendicular to at least one of said upper and lower surfaces of said implant.

185. The spinal implant of claim 175, wherein said forward facet is at an angle to at least one of said upper and lower surfaces of said implant.

186. The spinal implant of claim 185, wherein said angle is less than 90 degrees.

187. The spinal implant of claim 175, wherein said left and right rearward side facets intersect each other.

188. The spinal implant of claim 175, wherein adjacent left and right rearward side facets of adjacent surface projections are spaced apart to define a groove therebetween.

189. The spinal implant of claim 175, wherein said projections are oriented relative to one another to form an array.

190. The spinal implant of claim 175, wherein said projections are geometrically disposed relative to one another.

191. The spinal implant of claim 175, wherein said upper and lower surfaces of said implant are at least in part planar.

192. The spinal implant of claim 175, wherein said upper and lower surfaces converge along the length of said implant.

193. The spinal implant of claim 175, wherein said implant comprises a material other than bone.

194. The spinal implant of claim 175, wherein said implant comprises bone.

195. The spinal implant of claim 194, wherein said bone includes cortical bone.

196. The spinal implant of claim 175, wherein said implant comprises bone growth promoting material.

